

# SENDING PHOTOGRAPHS BY WIRELESS TELEGRAPHY

## LATEST of SCIENTIFIC DISCOVERIES.

Danish Engineer Contributes Valuable Addition to Useful Discoveries and Simplicity of Instrument Recommends It.

NOT more than half a dozen years ago it was an unheard of thing to transmit a photograph in any other

way than by mail or some other similar carrier. Within the last few years a method was perfected whereby the outlines of the portrait could be sent by telegraph, and now comes the greatest achievement of all—the transmission of a photograph by wireless telegraphy, and all this when the sending of ordinary messages has hardly been perfected.

The method of sending a portrait by wireless has but recently been tested and pronounced an unqualified success. A young Danish engineer is responsible for this contribution to science, and all the details of the discovery and its possibilities form an interesting article in the August number of the Technical World Magazine. It is written by Cecil Bembridge, and is as follows:

It is barely a dozen years since Signor Marconi first started the world by his achievement of dispatching and receiving messages from one distant point to another without any connecting wire between, the air itself acting as the vehicle for the conveyance of dots and dashes of the Morse code. But what remarkable strides have been effected in that short space of time! We have seen railway signals, torpedoes, and boats controlled in their operations from a suitable point with as much facility and reliability as if actuated on the spot by hand, and explosive mines fired, thereby, adding a new terror to the batt'led field. Now, another remarkable performance has been accomplished; one in which the interests of commerce will exercise a far-reaching influence upon every phase of industry from the 1 cent newspaper to the rapid detection of crime. This is the transmission by etheric agency of photographs, pictures of all descriptions, hand-writing, and designs—in short anything of an illustrative character.

This invention which has been brought to a stage of commercial practicality, has been evolved by a young Danish engineer, who has already made many epoch-making discoveries to his credit, Mr. Hans Knudsen, now resident in London. The apparatus is no mere scientific toy, but a concrete proposition capable of utilization whatever wireless communication is at present maintained, irrespective of distance or the individual character or any system of etheric communication in vogue. That is to say, it is not only applicable to the Marconi, but can be employed with equal reliability and facility in conjunction with the De Forest, Poulsen, Lodge, or even the amateur's home-made wireless installation. Moreover, it is extremely simple both in design and operation, thereby dispensing with the necessity of a skilled operator. As a matter of fact, once set to work, it requires no further attention whatever either in transmission or receiving, since both operations are carried out with absolute synchrony by automatic means, and can thus be left entirely alone or at the utmost only supervised by a boy.

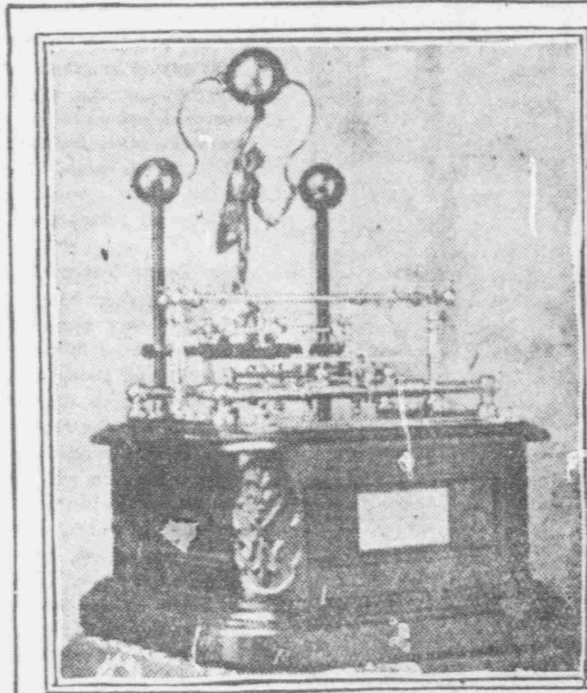
### Demonstration Witnessed.

Through the courtesy of the inventor, the writer was recently extended every facility to witness a demonstration and make a complete inspection of the installation, a general idea of which may be gathered from the accompanying illustrations. As will be realized it has no complicated details, and in fact comprises quite a small number of integral parts so that the possibility of sudden breaking down is very remote. Both the transmitter and receiver are mounted upon small hollow rectangular pedestals similar in appearance to the sounding box of a photograph and measuring only some two feet square. These contain the coil, clock-work driving mechanism, governor, and other electrical details and connections. The lids of the boxes carry two small tables on which the plates are clamped, and which

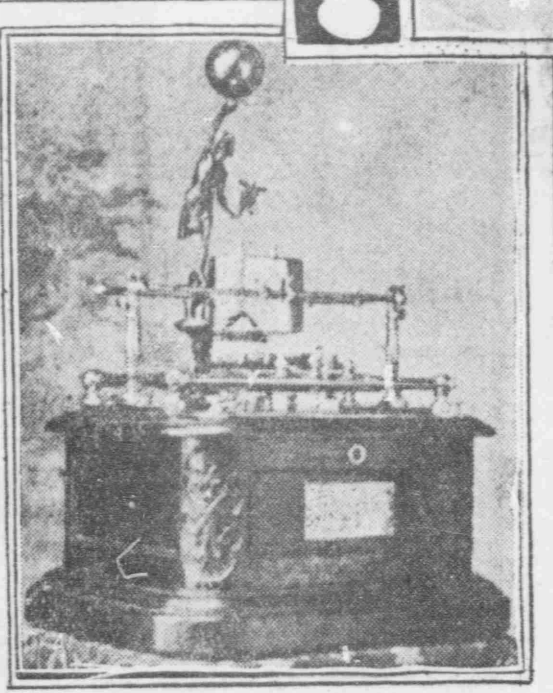
travel synchronously in two horizontal directions, longitudinally and laterally. In this particular installation pictures up to five inches in length by four inches in breadth can be handled, but there is no limit to its accomplishments since it is merely a matter of increasing the dimensions of the table to accommodate the size of picture to be dealt with. As a matter of fact Mr. Knudsen was engaged at the time of my visit in applying the finishing touches and tuning up of a larger plant which is designed to cope with pictures up to twelve inches in length by ten inches broad.

There is one very striking point in which this picture transmission system differs from others that have recently been invented. No selenium cells or light in any shape or form are employed. The inclusion of these two auxiliaries not only increases the size of the plant, but at the same time involves more elaborate working parts, delicate in construction and sensitive in working, so that the possibilities of complication are appreciably accentuated, and, indeed, require the services of a highly skilled operator. The Knudsen process is accomplished purely by electrical and mechanical agency, and the resultant effect does not differ from those secured by the selenium cells to any considerable extent, while it has the distinct advantage of being both simpler and quicker.

To describe the transmitting section of the plant first. Above the traveling table carrying the picture to be dispatched stretches a fine strip of pliable steel suitably supported at either end by adjustable screws. This length of steel in reality constitutes a very strong and sensitive spring, the tension of which can be adjusted easily and quickly at one end by a screw. From the center of this spring depends an inverted steel cone finely balanced, from the downward pointing apex of which projects a light lever carrying a very fine steel point which travels over the surface of the picture on the traveling table. Above



GENERAL VIEW OF TRANSMITTER



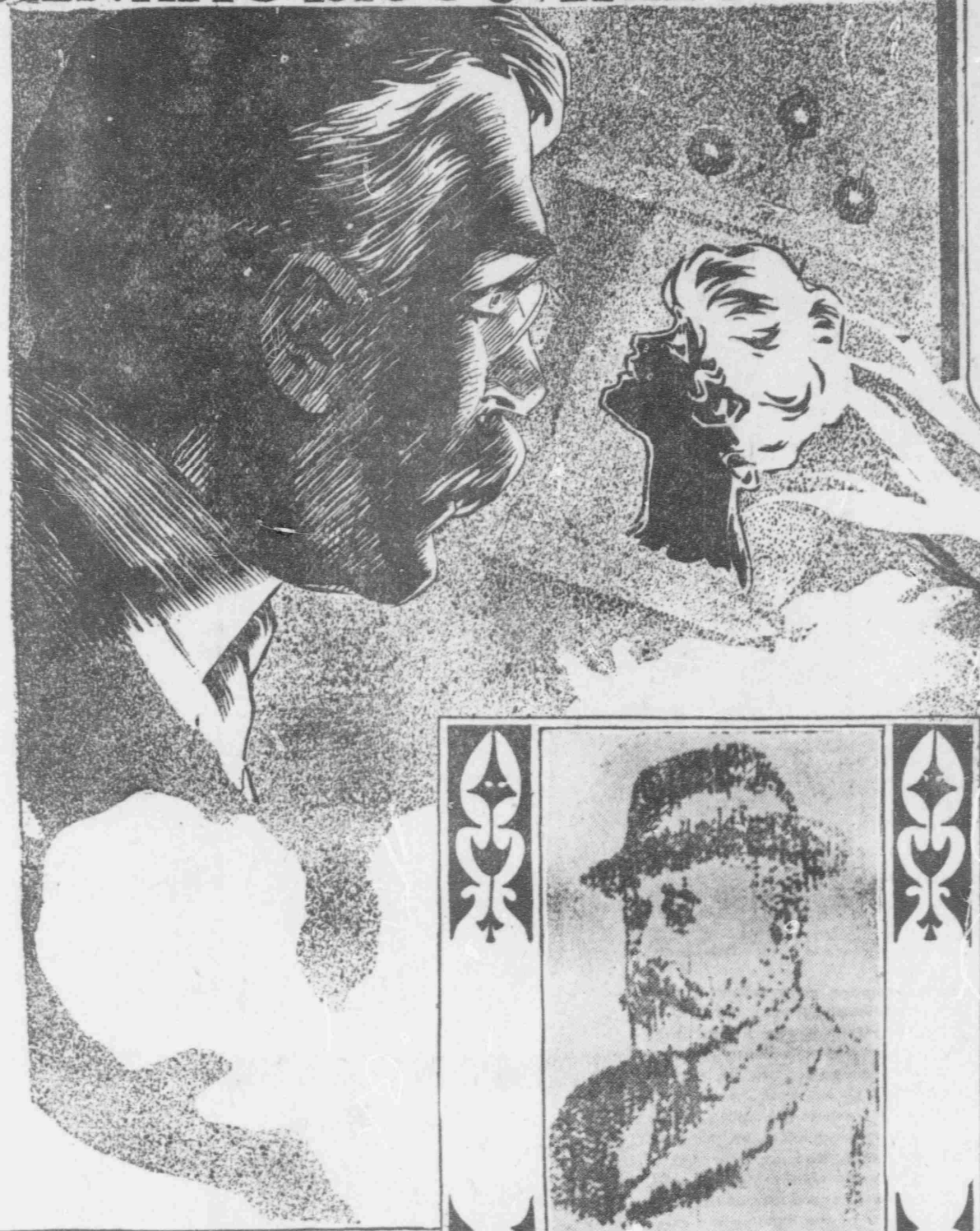
RECEIVER

the base of the cone, and separated therefrom by a space no greater than the thickness of a piece of paper is an electrical contact. Now owing to the cone and its needle being dependent from the steel spring, it is always vibrating but not sufficiently so to strike the electrical contact above. This is only accomplished when the needle in passing over a raised portion of the picture which is specially prepared for the purpose is lifted to an appreciable extent. Then the contact is formed, the electrical connection is established, and the impulse passing through the coil and the three spark balls shown at the back of the instrument to the aerial and is dispatched on its passage through the air.

The receiving instrument differs only in its special details from the transmitter, of which otherwise it is a duplicate in general design. There is the table carrying the plate upon which the picture is to be recorded, and which moves to and fro and forward in sympathy with the table of the transmitter. The arriving electrical impulse passes into a very sensitive relay to which is attached a delicate needle which normally swings above the plate beneath. The receipt of the impulse depresses this needle upon the plate so that its point pierces the film with which it is coated, leaving a very diminutive space of clear glass.

### Picture Specially Prepared.

The picture to be transmitted has first of all to be specially prepared for the instrument, and this preliminary operation constitutes in reality the most vital part of the whole process, since thereon depends the success of the illustration received at the other end. The portrait which is a positive print, picture, autograph, handwriting, wash drawing, pencil sketch, or what not, is photographed through a glass screen. This is ruled with a number of fine spider-like lines averaging about fifty to the inch, but extending only in a straight line across the plate. This phase of the process, as a matter of fact, is closely akin to the



WIRELESS TELEPHOTOGRAPH OF KING EDWARD VII

touches the film. It travels up the first line of dots. As the outline of the picture is approached the first dot looms in its path. It strikes the edge of it but the needle being too rigidly fixed to swing round it, it is lifted until it reaches the top of the obstructing dot when the flat end of the inverted cone to which it is attached, strikes the electric contact above, where is a sharp click notifying the completion of the electrical circuit, accompanied by a loud crack announcing the dispatch of that dot impulse into the illimitable ether on its way to the receiving station. As the dots are of uniform dimensions aggregating some 200 to the square inch the contacts are short and sharp, and of equal duration. The needle after dropping over the side of the dot falls into the hollow dividing it from its neighbor, thereby releasing contact and opening the circuit. Another dot has to be negotiated, and the same operation is repeated. The needle is traveling over a dense part of the picture where the dots follow so quickly as to make almost a continuous line, and the succession of clicks and snappy cracks of the contacts follow so incessantly as to make almost a continuous roll, but each dot is completely isolated from its neighbor. Presently the clicks slacken and become more infrequent, finally ceasing altogether. The needle is passing over a clear stretch of glass where no dots exist, this part of the film having been uncovered by dissolution in the developer. Again a succession of clicks are heard, but spasmodic and with a longer interval between reports. The needle is transmitting the half-tone gradations, the dots of which are not close together being broken up, or separated by diminutive white spaces between. Another silent interval and then comes another rapid roll of clicks increasing in intensity and finally ceasing altogether. The needle has traversed the first line and the cone comes to a stop, the traveling mechanism being tightly clutched by an electromagnetic brake. Automatically the traveling table moves forward a space like the carriage of a typewriter until the second line is brought into the track of the needle. There is a sharp crack. It is independent, but its purpose is of great import. It has moved the traveling carriage of the receiver forward a corresponding distance ready for receiving the second line, this operation being effected through a special coherer. Silence once more for a moment and then the needle is again swinging across the plate along the second line of dots, repeating the same succession of impulses as it comes into contact with them in its path until the second line is completed. Another momentary stop. The plates move longitudinally forward another space to the next line, the synchronizing signal is flashed to the receiving station, and the next line covered, the cycle of operations being repeated until the end of the plate is reached.

### Placed on Traveling Table.

The picture plate ready, it is laid on the traveling table, and firmly clasped thereto to obviate any tendency to move during transmission. The instrument is then electrically connected to the terminals of the Morse key used for dispatching messages, so that now the electric signals or impulses discharged into the air instead of representing dots and dashes corresponding to words, comprises uniform dots. The clock driving mechanism is wound up to drive the table, and a preliminary signal flashed to the receiving end to announce readiness to transmit. Upon this the operator at the latter station places a glass plate covered with a film of lamp black upon the receiving traveling table, winds up the clock and sets the plate in the correct position. When all is ready the transmitter moves his table and plate along until the needle is immediately above the first line of dots, and releases the switch controlling the driving mechanism. He has nothing more to do now until the needle has passed over the last dot at the opposite extremity of the plate.

The transmission of the picture is a fascinating spectacle. It is carried out rapidly but surely. The needle vibrating so rapidly under the tension of the steel spring as almost to appear practically stationary barely

### At the Receiving Station.

At the receiving station the spectacle is equally absorbing, but a much more weird and impressive. The operator is preparing his machine



HANS KNUDSEN AND HIS INSTRUMENTS

for the receipt of the picture. A lamp-black coated glass is clamped to its table and in the correct position. The little needle hanging from the relay enclosed in its small metal box attached to a cross bar above the traveling carriage looks like a slender leg with its foot almost touching the film of the plate. The carriage moves. Suddenly there is a slight report. The needle dips and plunges into the atomic coating on the plate. It swings clear and as it withdraws a pinhole is left in the film. Instantly there is another dig into the lamp black. Another pinhole, followed by another, and another. The row of dots is distinctly visible but the division between each is so slight that it seems as if the needle is drawing a fine line across the plate. The needle becomes quiescent. A clear stretch of lamp black corresponding to the clear area of the positive is left, then comes a series of intermittent plunges here and there as if the needle had suddenly become erratic. Another clear space followed by more hurried plunging and pricking and then the carriage stops. The end of the line is gained.

Thus the operation continues its run with monotonous regularity. The machine completes its task governed from a distance of hundreds or maybe thousands of miles. The operator carefully withdraws the picture from the carriage. It is a negative of the picture placed in the transmitter. He places it in the ordinary photographic printing frame and within a few minutes secures a proof on sensitized paper of the illustration, by the conventional contact printing.

The realization of this invention opens up new and vast possibilities not only in connection with newspapers, but other branches of industry, since it is equally applicable to the transmission of handwriting and designs. In the service of the detection of crime it will be of far-reaching effect.

### POKER AND BRIDGE.

Knicker—"I was sitting up with a very sick friend last night, I tell you." Mrs. Knicker—"Yes, I sat up with his sick wife all this afternoon." Hansper's Bazar.

